



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
|-----------------|-------------|----------------------|---------------------|------------------|

10/500,079

03/01/2005

Jochen Kraft

14603-007US1

5865

26161 7590 03/06/2008

FISH & RICHARDSON PC
P.O. BOX 1022
MINNEAPOLIS, MN 55440-1022

EXAMINER

MAI, ANH D

ART UNIT

PAPER NUMBER

2814

MAIL DATE

DELIVERY MODE

03/06/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

| | | | |
|------------------------------|--------------------------------------|-------------------------------------|--|
| Office Action Summary | Application No. 10/500,079 | Applicant(s) KRAFT ET AL. | |
| | Examiner Anh D. Mai | Art Unit 2814 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 27 December 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,2,4,7,11-18 and 28 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2,4,7,11-18 and 28 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on November 29, 2007 has been entered.

Status of the Claims

2. Amendment filed November 29, 2007 is acknowledged. Claims 1, 13, 19 and 20 have been amended. Claims 3, 5, 8, 10 and 19-27 have been cancelled. Claims 1, 2, 4, 7, 11-18 and 28 are pending.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 1, 2, 4, 7, 11-18 and 28 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 1 and 13 recite: a base layer comprising:...

first doping layer that is doped with a *trivalent substance*; ...

second doping layer that is doped with a *trivalent substance*;...

... the first and second doping layer are **counter-doped with a pentavalent substance** from.....

There are three scenarios might happen upon the counter-doped:

- A. If the dopant concentration of pentavalent substance were less than that of the trivalent substance, then, the conductivity type of the first and second layers remain P-type.
- B. If the dopant concentration of pentavalent substance were higher than that of the trivalent substance, then, the conductivity type of the first and second layers become N-type.
- C. If the dopant concentration of pentavalent substance were the same as that of the trivalent substance, then, the first and second layers are non-conductive (neutralized).

Claims 1 and 13 appear to encompass both first and second layers being counter-doped.

As shown above, the conductivity of the first and second layers could not be determined.

Therefore, the scope of the claims 1, 2, 4, 7, and 11-18 can not be fairly determined.

Claim 28 recites:

Lines 7-10: a first doping layer that is doped with a *trivalent substance*, that extends into the extrinsic region and that is *counter-doped* with a *pentavalent substance* from the emitter region; wherein the first doping layer comprises a concentration of the trivalent substance that is between $E18$ and $5E20\text{ cm}^{-3}$;...

Lines 11-16: a second doping layer that is doped with the *trivalent substance*, that extends into the extrinsic region, and that is *counter-doped*, at least part-way through, *with a pentavalent substance* from the emitter region, *wherein the second doping layer comprises a concentration of the pentavalent substance that is between $E20$ and $E21\text{ cm}^{-3}$, wherein the second doping layer comprises a concentration of the trivalent substance that is between $E18$ and $E19\text{ cm}^{-3}$; ...*

As discussed above in claims 1 and 13, the concentration of pentavalent substance ($E20$ and $E21\text{ cm}^{-3}$) is higher than that of the trivalent substance of the first ($E18$ and $5E20\text{ cm}^{-3}$) and second ($E18$ and $E19\text{ cm}^{-3}$) doping layers, respectively. Therefore, the conductivity type of the first and second layers become N-type, since both are being counter-doped by an higher concentration of pentavalent substance.

Claim 28 is indefinite because, the limitations appear to encompass the first and second doping layers being both N-type and P-type at the same time.

4. Claims 11, 12 and 14-16 are further rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 11 and 14 recite: wherein the second doping layer and the third doping layer are **doped with germanium**.

Art Unit: 2814

It is well known in the art that “germanium” is a group IV element. Thus, germanium is neither trivalent nor pentavalent. Therefore, claims 11, 12 and 14-16 are also indefinite.

Note that, although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Since the scope of the pending claims can not be determined. The merits of the claims can not be fairly examined.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Anh D. Mai whose telephone number is (571) 272-1710. The examiner can normally be reached on 8:00AM-5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner’s supervisor, Wael Fahmy can be reached on (571) 272-1705. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2814

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Anh D. Mai/

Primary Examiner, Art Unit 2814